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EXAMINER	
KIM, CHONG R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/766,238	LAINEMA ET AL.	
	Examiner	Art Unit	
	Charles Kim	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *See Continuation Sheet* is/are rejected.

7)☒ Claim(s) *55,99,118-120 and 127* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 40,42,44-49,52,54,55,58-65,68,70-73,76-83,86-91,94-99,102,105,108-116 and 118-131.

Continuation of Disposition of Claims: Claims rejected are 40,42,44-49,52,54,58-65,68,70-73,76-83,86-91,94-98,102,105,108-116,121-126 and 128-131.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 22, 2007 has been entered.

Response to Amendment and Arguments

2. Applicants' amendment filed on May 22, 2007 has been entered and made of record.

3. Applicants' arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 25) that "there is no teaching or suggestion in Nishi that a prediction for at least one pixel of a currently coded block is performed based on modified pixel values of an adjacent block, wherein the modified pixel values are obtained after decoding and performing a filtering operation." The Examiner disagrees. As noted in the previous Office Action page 5, the combination of Andrew and Nishi would entail the boundary filtering process of Andrew illustrated in figure 3, wherein the decompression process 300 is replaced by the intra predication process of Nishi. In particular, Andrew discloses (figure 3) modifying pixel values that are obtained after decoding (300) and performing a filtering operation (302), while Nishi teaches a decoding process that performs intra prediction based on a previously decoded image

block (figure 2). During operation, a first image block is decoded in step 300 (Andrew, figure 3). The decoded image block is then filtered across a block boundary in step 302, producing modified pixel values. Subsequently, step 208 causes the process to loop back to step 204. Step 204 proceeds to step 300, which performs decoding of the next block. During this decoding process, Nishi's disclosure suggests that intra prediction—prediction of a second block adjacent to the first decoded image block—can be performed based on a previously decoded image block (Nishi, col. 24, line 50-16). The Examiner notes that the previously decoded image block in Nishi's prediction process comprises the block that was modified by the filtering step 302 in the previous iteration of Andrew (figure 3). Thus, the disclosure of Andrew and Nishi would have suggested to one of ordinary skill to perform a prediction for at least one pixel value of an image block based on the modified pixel value of a previously decoded and filtered image block.

Applicants further argue (page 25) that because "Nishi discloses that the prediction values of a frequency component of the target block are generated with reference to frequency components of an adjacent block," "the combination of Nishi and Andrew neither operates the same way as in the independent claims nor provides the same result." The Examiner disagrees. Nishi discloses prediction of frequency components (coefficients), as well as prediction of pixel values. For instance, figure 2 illustrates that the predicted frequency coefficients are transformed into pixel values in steps 207 and 209. Thus, the decoding process of both Andrew and Nishi produce image pixel values.

Claim Objections

4. Claim 42 is objected to because it is dependent from claim 41, which is a canceled claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 40, 44-49, 58, 60-64, 70, 76, 78-82, 94-96, 111-113, 121, 123-126, 130, 131 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew") and Nishi, U.S. Patent No. 6,275,533 ("Nishi").

Referring to claim 40, Andrew discloses a method of encoding a digital image comprising a plurality of image blocks, the method comprising:

a. decoding (300) a first encoded image block (figure 3);

b. performing a filtering operation (302) across a block boundary between the first decoded image block and a previously decoded image block adjacent to the first decoded image block such that the pixel value of at least one decoded pixel in the first decoded image block is modified by the filtering operation (col. 4, line 5-col. 5, line 65).

Andrew does not explicitly disclose performing a prediction for at least one pixel value of a second block. However, this feature was exceedingly well known in the art. For example,

Nishi discloses performing a prediction for at least one pixel value of a second block, the second block adjacent to a first decoded image block (col. 24, line 50-col. 25, line 6 and figure 2). The Examiner notes that the combination of Andrew and Nishi would entail the boundary filtering process of Andrew illustrated in figure 3 with the decompression process 300 being replaced by the intra predication process of Nishi. In particular, Andrew discloses (figure 3) modifying pixel values that are obtained after decoding (300) and performing a filtering operation (302), while Nishi teaches a decoding process that performs intra prediction based on a previously decoded image block (figure 2). The Examiner notes that the previously decoded image block in Nishi's prediction process comprises the block that was modified by the filtering operation 302 in the previous iteration of Andrew (figure 3). Thus, the disclosure of Andrew and Nishi would have suggested to one of ordinary skill to perform a prediction for at least one pixel value of an image block based on the modified pixel value of a previously decoded and filtered image block.

Andrew and Nishi are combinable because they are both concerned with image compression methods. Additionally, both Andrew and Nishi are concerned with compressing and decompressing images on a block-by-block basis. Andrew's boundary filtering process includes a decoding step 300 (Andrew, figure 3). Nishi explains that the INTRA-prediction technique enhances the efficiency of the coding/decoding process (Nishi, col. 3, lines 24-33). Therefore, it would have been obvious to modify Andrew's decompressing step 300 to include the intra prediction technique of Nishi. The suggestion/motivation for doing so would have been to improve the coding efficiency of Andrew's boundary filtering process.

Referring to claim 44, Nishi further discloses decoding of the encoded image block that comprises performing prediction with reference to a previously decoded image block adjacent to the block (col. 24, line 50-col. 25, line 6 and figure 2).

Referring to claim 45, Andrew further discloses that the filtering operation across the boundary between the first decoded image block and the previously decoded image block is performed immediately after the first image block is decoded (figure 3).

Referring to claim 46, Andrew and Nishi disclose that the filtering operation across the boundary between the first decoded image block and a previously decoded image block adjacent to the first decoded image block is performed before performing prediction for the second block (Andrew, figure 3. Note that the filtering operation is performed in step 302. Subsequently, step 208 loops back to step 204 and the prediction is performed in step 300, as explained above).

Referring to claim 47, Andrew further discloses that the filtering is performed due to more than one boundary between the first decoded image block and previously decoded image blocks adjacent to the first decoded image block (col. 5, lines 1-63 and figure 3).

Referring to claim 48, Andrew further discloses that filtering due to the more than one boundary is performed sequentially on more than one boundary in a certain boundary scanning order (col. 5, lines 1-63. Note that the two boundaries will be filtered in a certain order).

Referring to claim 49, Andrew discloses the step of filtering the boundary to the left of the first block and the boundary to the first of the current block (col. 5, lines 35-49), but does not explicitly disclose that the order of filtering boundaries is selected such that a boundary to the left of the first decoded image block is filtered before a boundary to the top of the first decoded image block. However, the Examiner notes that the specific filtering order is not considered a

patentable distinction, since it would have been chosen by the user during experimentation in order to meet his/her specific requirements. Therefore, it would have been obvious to modify Andrew's filtering process so that the boundary to the left of the first block is filtered before a boundary to the top of the first block is filtered; since no new or unexpected results are seen to be attained by that specific filtering order.

Referring to claim 58, see the rejection of at least claim 40 above. Andrew discloses an encoder (602) for encoding a digital image comprising a plurality of image blocks, the encoder configured to:

a. encode a first image block to form a first encoded image block (col. 3, lines 1-36 and figure 6);

b. decoding the first encoded image block to form a first decoded image block (col. 3, line 37-col. 4, line 3);

c. the encoder comprising a filter arranged to perform a filtering operation across a block boundary between the first decoded image block and a previously decoded image block adjacent to the first decoded image block, such that a pixel value of the at least one decoded pixel in the first decoded image block is modified by the filtering operation (col. 4, line 5-col. 5, line 35 and col. 5, line 66-col. 6, line 14); and

Andrew does not explicitly disclose that the encoder is further configured to perform a prediction for at least one pixel value of a second block, the second block adjacent to the first decoded image block. However, this feature was exceedingly well known in the art. For example, Nishi discloses an encoder that is configured to perform a prediction for at least one pixel value of a second block, the second block adjacent to a first decoded image block (col. 24,

line 50-col. 25, line 6 and figure 2). The Examiner notes that the combination of Andrew and Nishi would entail the boundary filtering process of Andrew illustrated in figure 3 with the decompression process 300 being replaced by the intra predication process of Nishi. In particular, Andrew discloses (figure 3) modifying pixel values that are obtained after decoding (300) and performing a filtering operation (302), while Nishi teaches a decoding process that performs intra prediction based on a previously decoded image block (figure 2). The Examiner notes that the previously decoded image block in Nishi's prediction process comprises the block that was modified by the filtering operation 302 in the previous iteration of Andrew (figure 3). Thus, the disclosure of Andrew and Nishi would have suggested to one of ordinary skill to perform a prediction for at least one pixel value of an image block based on the modified pixel value of a previously decoded and filtered image block.

Andrew and Nishi are combinable because they are both concerned with image compression methods. Additionally, both Andrew and Nishi are concerned with compressing and decompressing images on a block-by-block basis. Andrew's boundary filtering process includes a decoding step 300 (Andrew, figure 3). Nishi explains that the intra prediction technique enhances the efficiency of the coding/decoding process (Nishi, col. 3, lines 24-33). Therefore, it would have been obvious to modify Andrew's decompressing step 300 to include the intra prediction technique of Nishi. The suggestion/motivation for doing so would have been to improve the coding efficiency of Andrew's boundary filtering process.

Referring to claim 60, Nishi further discloses that the encoder is configured to encode the first image block by performing prediction with reference to a previously encoded image block adjacent to the first block (col. 24, line 50-col. 25, line 6 and figure 2).

Referring to claim 61, see the rejection of at least claim 45 above.

Referring to claim 62, see the rejection of at least claim 47 above.

Referring to claim 63, see the rejection of at least claim 48 above.

Referring to claim 64, Andrew further discloses that the filter is arranged to use the modified pixel value due to at least one other boundary between decoded image blocks (col. 4, line 5-col. 5, line 65).

Referring to claim 70, see the rejection of at least claim 45 above.

Referring to claim 76, see the rejection of at least claim 40 above. Andrew discloses a decoder (602) for performing the method described above (claim 40).

Referring to claim 78, see the rejection of at least claim 44 above.

Referring to claim 79, see the rejection of at least claim 45 above.

Referring to claim 80, see the rejection of at least claim 47 above.

Referring to claim 81, see the rejection of at least claim 48 above.

Referring to claim 82, see the rejection of at least claim 64 above.

Referring to claim 94, see the rejection of at least claim 58 above. Andrew further discloses a terminal (figure 6) comprising the encoder described above.

Referring to claims 95-96, Andrew and Nishi do not explicitly disclose that the terminal is a wireless terminal of a mobile communications system. However, Official notice is taken that a wireless terminal of a mobile communications system was exceedingly well known in the art. Therefore, it would have been obvious to modify the terminal of Andrew and Nishi so that it is a wireless terminal of a mobile communications system. The suggestion/motivation for doing so would have been to enhance the mobility/flexibility of the system.

Referring to claim 111, see the rejection of at least claim 76 above. Andrew further discloses a terminal (figure 6) comprising the decoder described above.

Referring to claims 112-113, see the rejection of at least claims 95-96 above.

Referring to claim 121, see the rejection of at least claim 76 above.

Referring to claim 123, see the rejection of at least claim 78 above.

Referring to claim 124, see the rejection of at least claim 79 above.

Referring to claim 125, see the rejection of at least claim 46 above.

Referring to claim 126, see the rejection of at least claim 80 above.

Referring to claim 130, see the rejection of at least claim 58 above.

Referring to claim 131, see the rejection of at least claim 76 above.

6. Claims 42, 59, 77, 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew"), Nishi, U.S. Patent No. 6,275,533 ("Nishi"), and Osa, U.S. Patent No. 6,496,605 ("Osa").

Referring to claim 42, Andrew and Nishi do not explicitly disclose that the decoding of the first image block comprises performing motion compensated prediction with respect to a reference image. However, this feature was exceedingly well known in the art. For example, Osa discloses the step of decoding an image block that comprises performing motion compensated prediction with respect to a reference image (col. 4, lines 20-64, col. 9, lines 6-35, and figure 8).

Andrew, Nishi, and Osa are combinable because they are all concerned with coding an image by dividing the image into a plurality of blocks. At the time of the invention, it would

have been obvious to a person of ordinary skill in the art to modify the decoding process of Andrew and Nishi so that it is performed using motion compensated prediction, as taught by Osa. The suggestion/motivation for doing so would have been to provide a block boundary filtering performance that is much more powerful than typical filtering systems (Osa, col. 9, lines 30-35). Therefore, it would have been obvious to combine Andrew and Nishi with Osa to obtain the invention as specified in claim 42.

Referring to claim 59, Andrew and Nishi do not explicitly disclose that the encoder is configured to encode the first image block by performing motion compensated prediction with respect to a reference image. However, this feature was exceedingly well kwon in the art. For example, Osa discloses an encoder that is configured to encode a first image block by performing motion compensated prediction with respect to a reference image (col. 4, lines 20-64, col. 9, lines 6-35, and figure 8).

Andrew, Nishi, and Osa are combinable because they are all concerned with coding an image by dividing the image into a plurality of blocks. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the encoding process of Andrew and Nishi so that it is performed using motion compensated prediction, as taught by Osa. The suggestion/motivation for doing so would have been to provide a block boundary filtering performance that is much more powerful than typical filtering systems (Osa, col. 9, lines 30-35). Therefore, it would have been obvious to combine Andrew and Nishi with Osa to obtain the invention as specified in claim 59.

Referring to claim 77, see the rejection of at least claim 42 above.

Referring to claim 122, see the rejection of at least claim 77 above.

7. Claims 52, 54, 65, 68, 71-73, 83, 86-91, 97, 98, 102, 105, 108-110, 114-116, 128, 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew"), Nishi, U.S. Patent No. 6,275,533 ("Nishi"), and Keith et al., U.S. Patent No. 5,493,513 ("Keith").

Referring to claim 52, Andrew and Nishi do not explicitly disclose that the image blocks are grouped into macroblocks. However, this feature was exceedingly well known in the art. For example, Keith discloses a digital image comprising image blocks that are grouped into macroblocks (col. 6, lines 15-28 and figure 5). Keith further discloses the step of processing the image macroblock by macroblock according to a certain macroblock scanning order (col. 6, lines 15-28 and figure 5). Thus, the Examiner notes that the disclosure of Keith to perform image processing on an image macroblock by macroblock according to a certain macroblock scanning order coupled with the disclosure of Andrew to perform image processing by filtering across block boundaries between adjacent decoded image blocks would have suggested to one of ordinary skill to filter the image macroblock by macroblock according to a certain macroblock scanning order.

Andrew, Nishi, and Keith are combinable because they are both concerned with coding an image by dividing the image into a plurality of blocks. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image blocks of Andrew and Nishi so that they are grouped into macroblocks and processed according to a macroblock scanning order, as taught by Keith. The suggestion/motivation for doing so would have been to enhance the processing speed of the encoding and decoding process (Keith, col. 1, lines 10-56).

Therefore, it would have been obvious to combine Andrew and Nishi with Keith to obtain the invention as specified in claim 52.

Referring to claim 54, Andrew further discloses that the filtering to reduce visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded image block is performed for all boundaries within an image block before filtering to reduce visual artifacts is performed within the next image block in the scanning order (col. 5, lines 12-65 and figure 3). However, Andrew does not explicitly disclose that the filtering is performed on all boundaries within a macroblock before filtering the next macroblock in the scanning order.

Keith discloses the step of processing all the image blocks of a given macroblock in a macroblock scanning order before processing image blocks of the next macroblock in the macroblock scanning order (col. 6, lines 15-28 and figure 5). Accordingly, the combination of Andrew, Nishi, and Keith disclose that the filtering is performed on all boundaries within a macroblock before filtering the next macroblock in the scanning order.

Referring to claim 65, see the rejection of at least claim 52 above.

Referring to claim 68, Andrew further discloses that the encoder is arranged to encode and subsequently decode the image blocks in a certain block scanning order (col. 3, lines 1-67 and col. 5, lines 35-65). As noted above (claim 65), Keith discloses image blocks that are grouped into macroblocks, wherein the image blocks of a macroblock are encoded and subsequently decoded according to a certain block scanning order (col. 6, lines 15-28 and figure 5). Accordingly, the combination of Andrew, Nishi, and Keith disclose the step of encoding and subsequently decoding the image blocks of a macroblock in a certain block scanning order.

Referring to claim 71, see the discussion of at least claim 47 above.

Referring to claim 72, see the discussion of at least claim 48 above.

Referring to claim 73, see the rejection of at least claim 54 above. Note that "segment" is interpreted as being analogous to "macroblock."

Referring to claim 83, see the rejection of at least claim 52 above.

Referring to claim 86, see the rejection of at least claim 68 above.

Referring to claim 87, Andrew further discloses the step of encoding and subsequently decoding the image blocks of a macroblock, as noted above (claim 52), but does not disclose that the processing (encoding and subsequently decoding) is performed on all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and subsequently decoding) image blocks of the next macroblock in the macroblock scanning order.

Keith discloses the step of processing (encoding and decoding) all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and decoding) image blocks of the next macroblock in the macroblock scanning order (col. 6, lines 15-28 and figure 5). Note that the combination of Andrew, Nishi, and Keith disclose that the processing (encoding and subsequently decoding) is performed on all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and subsequently decoding) image blocks of the next macroblock in the macroblock scanning order.

Referring to claim 88, see the discussion of at least claim 45 above.

Referring to claim 89, see the discussion of at least claim 47 above.

Referring to claim 90, see the discussion of at least claim 48 above.

Referring to claim 91, see the rejection of at least claim 73 above.

Referring to claim 97, see the rejection of at least claim 65 above. Andrew further discloses a storage medium comprising a computer program for operating a computer as an encoder, and the program code for performing the steps above (col. 5, line 66-col. 6, line 14 and figure 6).

Referring to claim 98, see the rejection of at least claim 52 above. Andrew further discloses a storage medium comprising a computer program for operating a computer as a decoder, and the program code for performing the steps above (col. 5, line 66-col. 6, line 14 and figure 6).

Referring to claim 102, see the rejection of at least claim 73 above.

Referring to claim 105, see the rejection of at least claim 73 above.

Referring to claim 108, see the rejection of at least claim 65 above. Andrew further discloses a terminal (figure 6) comprising the encoder described above.

Referring to claims 109-110, see the discussion of at least claims 95-96 above.

Referring to claim 114, see the rejection of at least claim 83 above. Andrew further discloses a terminal (figure 6) comprising the decoder described above.

Referring to claims 115-116, see the discussion of at least claims 95-96 above.

Referring to claim 128, see the rejection of at least claim 54 above.

Referring to claim 129, see the rejection of at least claim 73 above.

Allowable Subject Matter

8. Claims 55, 99, 118-120, 127 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 571-272-7421. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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